insomnia and sleep disturbances. Parametric and nonparametric test were used to compare differences between and within groups.

Results: In our study, adolescents with CFS stayed in bed longer and had a significantly delayed mid sleep time during work days compared to the healthy controls. Further, adolescents with CFS also scored significantly worse on insomnia (mean 3.4 vs 4.9), sleepiness (mean 3.7 vs 5.0) and awakening problems (mean 2.5 vs 4.9) on KSQ. Moreover, they report longer sleep onset latency than healthy controls (mean 75 min vs 31 min).

Conclusions: Our findings suggest that adolescents with CFS subjectively have more insomnia-, sleepiness- and awakening symptoms than their healthy peers. Objectively we found a sleeping pattern that indicates delayed sleep rhythm.

Disclosure: Nothing to disclose.

P414

EEG complexity as an indication for sleep-wake patterns in patients with disorders of consciousness

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Circadian rhythms in patients suffering from disorders of consciousness (DOC) are likely to yield diagnostic and prognostic value. Eye opening and closing might correlate with sleep-wake cycles yet are too inaccurate in order to draw a conclusive picture.

Here, we studied 24 h hours EEG recordings in two lights condition in a sample of 35 patients (18 UWS, 17 MCS). Additionally, 8 h healthy recording containing both wake periods and sleep, were performed. We analysed EEG complexity by using Permutation Entropy (PE) on 12 scalp electrodes. PE estimates complexity by extracting specific patterns from the signal and quantifying their probability of occurrence. PE can be seen as way to quantify the number of patterns present in the signal rather than their magnitude.

Across all groups, the 'rest state' (light OFF in VS/UWS, MCS and sleep in healthy) was characterized by reduced PE compared to the 'active' (light ON in VS/UWS, MCS and wake in healthy). Especially the difference between rest and active state was strongest for healthy individuals ($t_{25} = 9.070$, $P < 0.001$, $r = 0.88$), followed by MCS ($t_{16} = 2.438$, $P = 0.027$, $r = 0.52$) and smallest, yet marginally significant for VS/UWS ($t_{17} = 1.795$, $P = 0.091$, $r = 0.4$).

Results suggest preserved, however impaired, circadian reactivity in patients, with VS/UWS patients showing the strongest deterioration of the sleep-wake cycle. Present results add to a recent study by Thul et al. (2016) who have shown reduced EEG complexity in DOC patients during the active waking state.

Disclosure: Nothing to disclose.

P415

Sleepiness and fatigue in multiple sclerosis - same same but different? A systematic review on the Epworth Sleepiness Scale as an assessment tool

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Objectives: Fatigue is a frequent and distressing symptom in patients with multiple sclerosis (MS). In contrast, sleepiness, characterized by difficulties to stay awake and alert during the day, seems to be less prevalent in MS; however exact studies are lacking. In addition, there is a semantic confusion of the concepts of "fatigue" and "sleepiness", which are often used interchangeably.

Methods: We conducted a systematic review of studies using the Epworth Sleepiness Scale (ESS) for the assessment of daytime sleepiness in patients with MS.

Results: The summarized results of 48 studies demonstrate that sleepiness, as indicated by elevated ESS scores, is less prevalent and less severe than fatigue but is present in a significant proportion of patients with MS. In most cross-sectional and longitudinal studies, there was a moderate association between ESS scores and various fatigue rating scales. Longitudinal studies on the effect of wakefulness-promoting agents failed to show a consistent improvement of sleepiness or fatigue as compared to placebo. It has also been shown that daytime sleepiness is frequently associated with comorbid sleep disorders that are often underrecognized and undertreated in MS.

Conclusions: Sleepiness and potential sleep disorders may also precipitate and perpetuate fatigue in patients with MS and should be part of the differential diagnostic assessment. To support an appropriate decision-making process, we propose an algorithm for the evaluation of sleepiness as compared to fatigue in patients with MS.

Disclosure: Nothing to disclose.

P416

Sleep related breathing disorders in ICU survivors

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ICU survivors perceived persistent reduction in quality of life with significant sleep complains. However, studies examining sleep in ICU survivors after hospital discharge are lacking. Thus, we evaluated the sleep architecture in ICU survivors within 72 h and at 6 months after hospital discharge.

Overnight polysomnography was performed in eligible ICU survivors without history of sleep disorders within 72 h (1st-evaluation) and at 6 months (2nd-evaluation) after hospital discharge.

Twenty-seven patients, (80% had acute-respiratory-distress-syndrome during ICU stay) were studied. Eight patients were lost to follow-up and thus the results of the 2nd-evaluation pertain to 19 patients. At 1st-evaluation sleep architecture was poor, characterized by normal sleep efficiency, high percentage of N1 [27.9% (21.4–36.0), median (interquartile range)] and low N3 [4.6% (0.5–5.9)] and REM [6.0% (1.0–15.7)]. Twenty-one patients (77.8%) exhibited mild ($n = 4$), moderate ($n = 11$) or severe ($n = 6$) sleep-apnea-syndrome of obstructive (OSAS, $n = 20$) or central type ($n = 1$). Compared to 1st-evaluation, at 2nd-evaluation apnea-hypopnea-index decreased significantly [(23.6 (15.8–27.7) vs. 11.0 (4.7–16.3) events/hour], while the other indices of sleep architecture did not change. At 2nd-evaluation 6 out of 19 patients (32%) exhibited moderate ($n = 4$) or severe (n = 2) OSAS, significantly less than these at 1st-evaluation [14 out of 19 (74%), moderate $n = 9$, severe $n = 5$, all OSAS].

At hospital discharge the majority of ICU survivors exhibited moderate to severe OSAS which improved significantly within 6 months, and persistent poor sleep quality. Reversible critical illness polyneuropathy and/or morphological upper airways abnormalities could contribute to syndrome development.

Disclosure: Nothing to disclose.